Update: Indoor Air & Sub-Slab Sampling – Homes at Motorola 52nd Street Site

Phoenix, AZ

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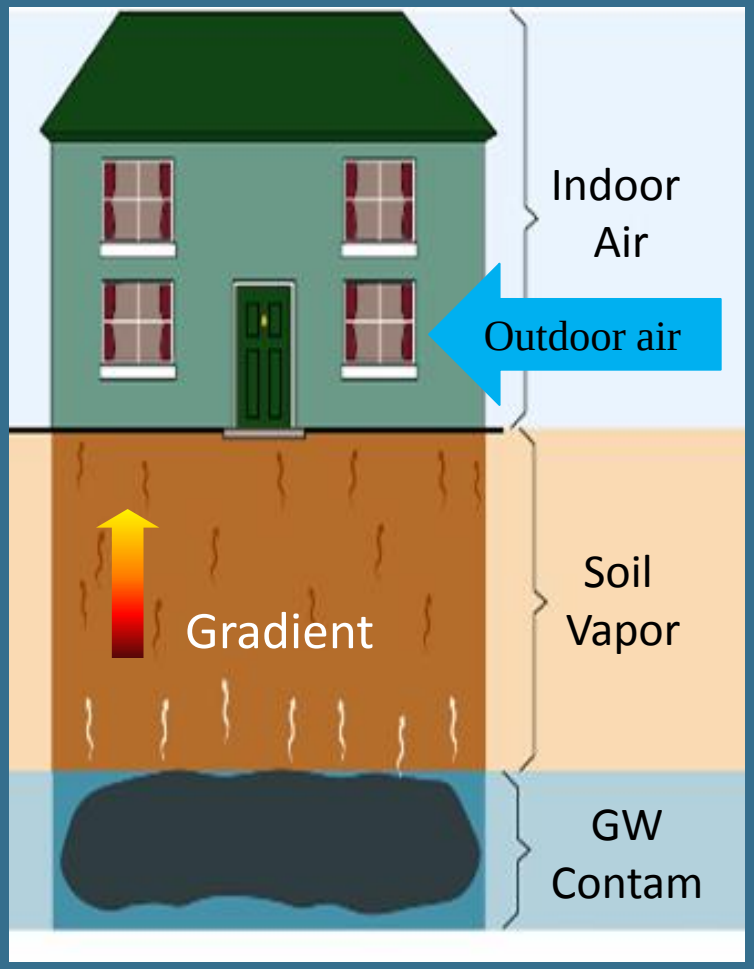
Soil Gas and Indoor Air

- Vapor intrusion = soil gas entering overlying buildings
- Questions to address:
  - Is VI happening?
  - If so, are indoor air exposures of potential health concern?



Outline

- Preview of findings
- New toxicity information on TCE & PCE
- Overview of how the potential for vapor intrusion is evaluated
- Area-by-area presentation of results

Preview of Findings

- No indoor air exposures that require emergency action/response
- Some homes identified for pre-emptive mitigation based on potential for future vapor intrusion
  - radon-type sub-slab depressurization
- Continue with on-going investigation

Contaminants of Concern

Contaminants of Primary Concern:

- Trichloroethylene (TCE)
  - present in some commercial products (e.g., gun-cleaner)
- Perchloroethylene (PCE)
  - PCE is dry cleaning solvent & present in some commercial products

Revised Toxicity Assessments

- PCE: Lower potential to cause cancer
  - Less stringent screening levels for indoor air exposures
- TCE: Higher potential to cause health effects
  - Indoor air screening levels more stringent

Highlights TCE Toxicity

Toxicity Re-Assessment Results

- "**Carcinogenic** to Humans" – previously "Probable" carcinogen
  - Continue to be regulated as a carcinogen
- Cancer Potency **higher**
  - ~ 3-times higher re: vapor intrusion
- **Non-cancer effects** of greater concern

Cancer Risk

Lifetime Cancer Risk – TCE Inhalation:

- EPA Protective risk range:
  - 1 in one-million to 100 in one-million increased chance of developing cancer
- TCE: **0.4 – 43 µg/m^3**
- Residential exposure:
  - 24 hours/day, 350 days/year, 30 years exposure

Non-Cancer Toxicity

Non-cancer Effects of TCE:

- Toxicity of the immune system
- Developmental: potential for heart defects in newborns
- Inhalation reference concentration:
  - Reference concentration (RfC): **2 µg/m^3**

Implications - VI Assessment

TCE Protective Risk Range:

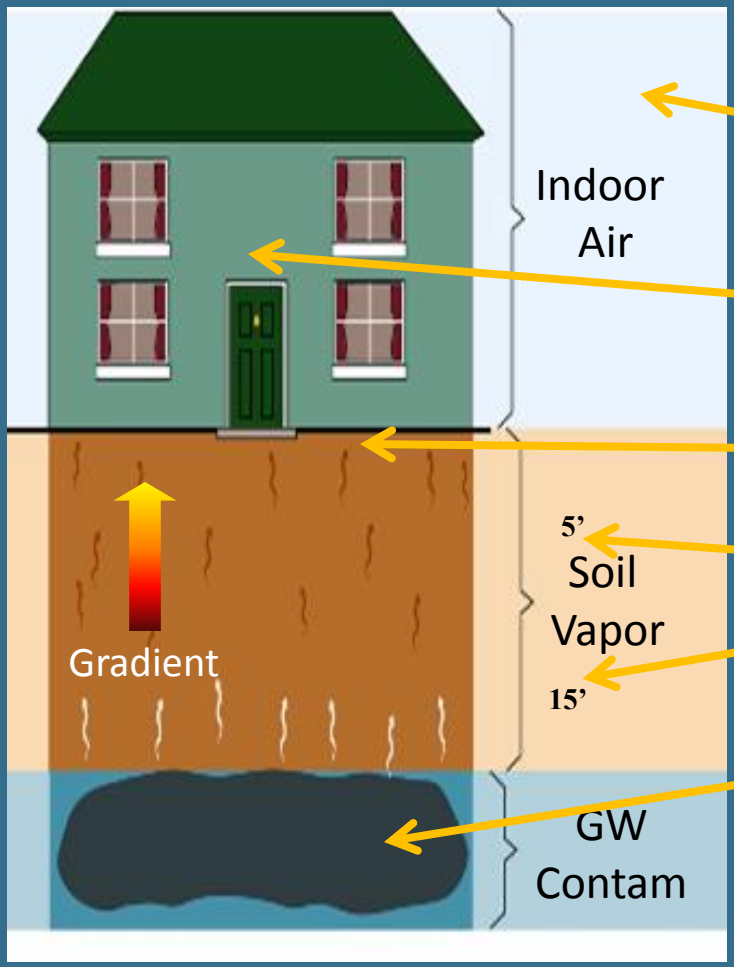
- Indoor air VI exposures
- New range: **0.4 – 2 µg/m^3**
  - 1 in one-million increased chance of developing cancer – increased chance of an effect on the immune system or newborns from maternal exposure
  - Old range: 1.2 to 10 µg/m^3

Use of Risk Range - Homes

TCE Protective Risk Range: **0.4 – 2 µg/m^3**

- < 0.4 µg/m^3 – Inhalation Risk Screening Level (IRSL)
  - Low risk: less than 1 in one-million lifetime cancer risk
  - No remediation unless potential for future VI
- 0.4 – 2 µg/m^3
  - Low risk: 1 - 5 in one-million lifetime cancer risk
  - Consider remediation based on potential for future VI
- EPA's Goal: residential exposures less than 2 µg/m^3
  - > 2 µg/m^3 risks start to increase for both non-cancer effects and cancer risks

Multiple Lines of Evidence



Vapor Intrusion?

- Outdoor air
- Indoor air
- Sub-slab
- Soil gas
- Groundwater

Results

- 2 Sampling Events: July & October 2011
  - 39 houses/apartments
  - 5 commercial/industrial buildings
  - 2 schools
- Indoor air & sub-slab data validated
- Results represent testing in individual homes – no addresses or specific locations will be presented (privacy)

Results: Indoor Air & Sub-slab

Willetta Area (9 Residences)

TCE – Indoor Air (8):

- 3 detections; 5 ND
- 2 below protective risk range
- 1 marginally into protective risk range

TCE - Sub-Slab (9):

- 4 sub-slabs non-detect
- 5 detections

N 50th St. (13 Residences)

TCE – Indoor (13):

- 5 detections; 8 ND
- 4 below protective risk range
- 1 within protective risk range

TCE - Sub-Slab (13):

- 11 detections
- 1 building identified for pre-emptive sub-slab mitigation
  - Elevated SS levels

McDowell Southside (10 Residences)

TCE – Indoor (10):

- 9 detections; 1 ND
- 5 below protective risk rage
- 2 within protective risk range
- 2 marginally above protective risk range

TCE - Sub-Slab (10):

- 9 detections
- 1 building identified for pre-emptive sub-slab mitigation
  - Elevated SS levels
- Additional residences identified to sample

McDowell Northside (8 Residences)

TCE – Indoor (8):

- 7 detections; 1 ND
- 3 below protective risk range
- 2 within protective risk range
- 2 marginally above protective risk range

TCE - Sub-Slab (8):

- 7 detections
- 4 buildings identified for pre-emptive sub-slab mitigation
  - Elevated SS levels
- Additional residences identified to sample

Schools

Indoor air sampled – 2 schools:

- Pre-school: 9 rooms sampled
  - TCE all ND
- Elementary-High School: 4 rooms sampled
  - 1 TCE detection; 3 ND
  - below protective risk range

Outdoor Air Results

Summary

- Indoor air sampled – 39 residences:
  - TCE detected in 24; 15 ND
  - TCE range: ND – 3.8 µg/m^3
- Sub-slab soil gas sampled – 40 residences
  - TCE detected 32; 8 ND
  - TCE range: ND – 13,000 µg/m^3
- 6 buildings identified for pre-emptive mitigation by installing a sub-slab depressurization system
- Outdoor air: ND – 1.4 µg/m^3

Conclusions & Comments

- No VI impacts to indoor air that require emergency response
- Sub-slab TCE levels in some areas indicate need for pre-emptive mitigation to prevent any significant future VI
  - Radon-type sub-slab depressurization
- No VI impacts at either school

Conclusions & Comments - 2

- Potential for some outdoor impacts on indoor air
- Some indoor air exposures likely due to house- hold products containing TCE
- Another round of IA & SS sampling to begin next week
  - seasonal effects?
  - additional residences added to sampling to expand area of investigation

Thank You

QUESTIONS?